Invento

INNOVATIONS IN ASSISTED LIVING CENTERS

1. ASSISTED LIVING CENTERS

Senior care living/assisted living has been an important aspect of government policymaking in the USA for a long time. The concept gained importance in the 1960s as facilities run by churches and charitable individuals slowly began facing financial troubles which limited their scope to cope up with the growing demand for senior care.

This problem, however, kept attracting continuous attention and things began to change once the concept of assisted living - an infrastructure that could provide basic necessities, healthcare assistance, and community support - was born in the 1970s.

Broadly speaking, the growth phase of assisted living can be split into two main periods. Between the 1980s to mid-1990s - the assisted living models gained initial traction as awareness grew. In the year 1982, Dr. Keren Brown Wilson widely touted as the founder of the model of assisted living centres in the USA, opened the Park Place Facility in Oregon. Park Place featured private rooms and came along with 24-hour staffing for medical emergencies and community spaces for interaction and social activities.

OVERVIEW

1. Concept of Assisted Living Centres.
2. A look at the Global market estimate
3. Latest technologies that can be implemented for a better lifestyle.
4. Collaboration of human caregivers and technology should be the way forward

Elderly care gained prominent attention in the political circles and gained the attention of public and private players from the mid-1990s and in the 2000s. This period saw great investments and the growth of the industry shot up drastically.

The last two decades have seen the industry transition into the 3rd phase of technological adoption. The facilities became cosy and nursing facilities became more accessible due to Medicare and Medicaid, the senior care living centres saw plenty of new technologies getting implemented [1].

The private players experimented with a variety of ideas to further improve the lives of the elderly. Robotics, process automation, health tech, wearable's, sensors all have seen their share of minor

adoption but a large-scale implementation has not happened yet.

Here in this report, we try to delve deep into the collaborative tech as well as senior care ecosystem to find key pieces of technology that can be adopted at a massive scale to modernize post-retirement care for seniors (also known as the baby boomer's generation)

1.2 Existing Senior Living Infrastructure

During the early stages of the development of the senior care ecosystem, it was more about providing medical care, than food and shelter or even community support.

Year/Period	EVENT
The 1860s	The elderly was sent to live in the Poorhouses and Almshouses, due to the poor economic conditions as a result of the civil war.
The 1900s	The churches build houses for the elderly. In the 1920s, 70% of the almshouses were occupied by elderly citizens.
1935	US Govt. enacted the Social Security Act to dispense with almshouses and relocate the elderly to a better environment with financial support.
1954	Hill-Burton Act provided grants for nursing homes, thereby starting the nursing home boom.
1965	Medicare and Medicaid are introduced, for health coverage.
The 1970s	The Billion-dollar industry of Assisted Living was born. The nursing homes were given specific conditions to be satisfied to receive grants which paved the way to assisted living.

The very first modern nursing homes were more similar to "hospitals" while the idea of co-living existed mainly in the boarding homes built and run by churches and communities. Soon both the infrastructures saw an amalgamation as the private players chose to make most of the government aid which was flowing.

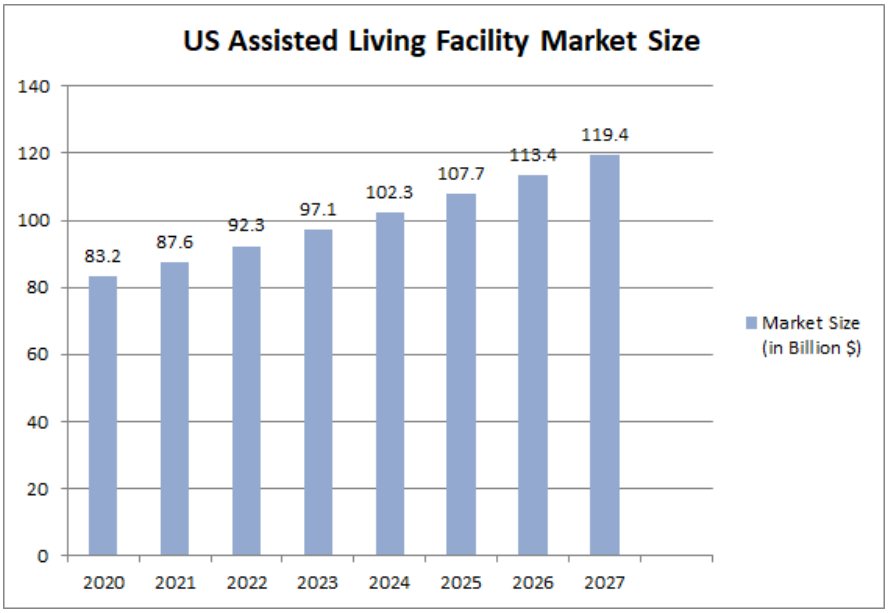
The launch of Medicare and Medicaid in 1965 played a key role in this boom as seniors now had very little to worry about their healthcare expenses. Emphasis on helping seniors live with "independence" and lead a social life in a residential environment led to the creation of sophisticated nursing homes. The seniors

had personal furniture, separate kitchens, bedrooms, electronics devices for entertainment, nurses managing them 24x7, and later on even pets were allowed. This was game-changing and even several decades later happens to be an industry norm.

2. GLOBAL MARKET

According to research, the global market for Geriatric Care Services is valued at over $1075.4 billion in 2020 and is expected to witness more than 8.5%[2] CAGR from 2020 to 2024.

The USA has the highest share of the market among the countries. The US assisted living facility market alone was valued at $83.2 Billion in 2020. The market in this segment is expected to grow at a CAGR of 5.3% [3] over the next 5 years.



The primary factor driving this growth in demand is an exponential increase in the geriatric population. Furthermore, diseases and other comorbidities coupled with the problems faced due to old age will drive up the market for seniors.

Additionally, the care provided by these facilities can be directly related with a longer life and a lower risk of rehospitalisation for the seniors according to a study in the Journal of the American Geriatrics Society.

3. ACTIVITIES OF DAILY LIVING FOR SENIORS

Activities of Daily Living are basic self-care tasks that the senior has to perform daily which provides with an assessment as to how well the individual can live independently and take care of the basic needs.

Old age is one of the most common causes which result in the inability to complete the basic functionalities. This is followed by degenerative diseases like Alzheimer's and other factors such as side effects of medications, social isolation, etc.

A study by the Centres for Disease Control of seniors living in 2,302 residential care facilities revealed the following data[4]:

1. 54% of the population living in senior cares were 85 or older.
2. More than 30% of the seniors required assistance in 3 or more activities of daily living, of which 72% required help in bathing and 36% required toileting assistance.
3. About 42% of the seniors had Alzheimer's and 57% had high Blood Pressure.

The basic Daily Living Activities include[5]:

- Eating: Ability of a person to feed oneself.
- Personal Hygiene: Grooming and maintaining the cleanliness of his/her body.
- Dressing: Ability to dress oneself without support.
- Toileting: Ability to go to the toilet to fulfil one's elimination needs.
- Transferring: Moving from one place to another independently
- Continence: Ability to control bowel and bladder functions

A test based on the above essential activities helps you understand how well the seniors can take care of their needs independently. Accordingly, the level of support required can be determined and relevant measures can be taken. For limited support, frequent monitoring or support from friends or family would suffice. However, if it is deemed that the seniors cannot perform most of the tasks, it is advisable to move them to a senior living care facility where they would receive continuous monitoring and care.

The test also gives the caregiver an accurate measure of the extent of healthcare support required, which is of critical importance.

3.1 STEADI: Older Adult Fall Prevention

The Centre for Disease Control and Prevention started the Stopping Elderly Accidents, Death and Injuries (STEADI) initiative for effective fall prevention and remedial measures for the elderly.

According to research, more than $30 billion per year is spent on fall-related illnesses in the United States [6]. Further, falls are the number one cause of injury for the elderly. According to the National Council on Aging, every 19 minutes an elderly person dies from injuries sustained in a fall [7]. Apart from the monetary burden, falls lead to further complications with hip-related problems one of the most common aggravations leading to a compromised quality of life.

There are numerous risk factors involved in falling which can broadly be classified into two: Intrinsic Factors (old age, muscle weakness etc.) and external factors (accidents).

STEADI test offers a co-ordinated approach factoring in the risk factors and the individuals risk assessment to give a comprehensive risk analysis and fall prevention recommendations.

STEADI test takes place in 4 phases [8]:

1. Screening: The individual has to answer a set of questions which will help gain an insight into the elderly's vulnerability to falls. If the individual falls in the non-risky category, they will be educated on fall prevention. Further recommendations include repeating the test yearly and also to join community centres which provide training on how to prevent falls.

If the individual is found to be vulnerable to falls, an assessment on the risk factors will be undertaken to provide more details.

2. Assessment: The individual found to be at risk will undergo a detailed physical and medical test to identify all the risk factors associated with falling.

Common Assessments include: Balance test, 30-second chair stand, Vitamin D intake assessment, visual acuity test etc.

3. Intervention: After the assessment the medical and physical risk factors associated with each individual will be analysed. Accordingly, the relevant steps and recommendations to reduce the identified risk factors will be implemented. Required physical training and medications will be provided to the elderly.

4. Follow ups: Frequent follow ups with the individual to keep track of the improvements and continuous assessments.

4. LATEST TECHNOLOGIES IN SENIOR LIVING CARES

There has been an acute rise in the number of seniors residing in living care facilities. Combine this with a shortage of nurses and clinical staff, a recent analysis of US government data showed that 23%[9] of nursing homes for the elderly in America had reported shortage in the staff required, leading to a critical issue in providing care to the seniors already susceptible to injuries and diseases due to their age.

The latest technology developments implemented in assisted living centres focuses on solving these problems to an extent. Even though a direct replacement of staff with machines is not feasible, innovations in this segment have led to ensure continuous improvement in the quality of life and assistance provided to the seniors.

4.1 Tele-Health:

Tele-Health is one of the latest technologies to be implemented in senior living care. It offers remote consultation between healthcare providers and patients for remote diagnosis. Tele-health provides fast and easy access to healthcare for seniors which will prove critical in the early diagnosis of symptoms thus increasing the odds of successful treatment and thereby survival.

Seniors experiencing even the slightest fever or symptoms can immediately connect with the on boarded Doctors via video call for an online consultation. The patient will be connected to the relevant Doctor for consultation remotely, with internet connectivity being the only dependency.

A lot of technological advances have taken place in this field. Companies such as Invento Robotics have integrated IoT devices like e-stethoscope, oximeter etc. to the tele-health consultation to record vitals of the seniors and provide better and critical information to the on boarded Doctors during remote diagnosis.

During the present pandemic, tele-health has become a necessity. Early diagnosis of symptoms will help in better treatment thereby arresting their spread. Tele-health will also limit the number of physical trips the seniors must make for their health care.

4.2 Fall Detection:

Fall detection technology is increasingly being implemented across senior care to help detect falls and provide instant responses. Sensors and computer vision technology can detect when the posture of a person changes from vertical to the

horizontal position, thus raising an alarm to alert the caregiver responsible. This will help in cutting down the response time leading to better chances of survival and recuperation.

Fall detection technologies are basically divided into wearables and computer vision technologies. In wearables, the patient will be wearing a pendant or similar devices which will have sensors to detect the change in posture from vertical to the horizontal. These will be connected to the operator who will immediately receive an alert in case of a fall.

The technologies implemented in wearables can further be extended to track heart rates, breathing, sleeping patterns and fitness trackers providing a comprehensive report.

Computer vision technologies usually deploy Robots to patrol the facility autonomously. The computer vision integrated with the Robots will help to detect a fall and the operator will be alerted immediately to assist.

4.3 Companion Robots:

Loneliness leading to depression is one of the most common issues faced in senior living care. Mental depression can subsequently lead to a host of illnesses which needs to be resolved.

Companies like Invento Robotics are developing Robots which can act as a companion and double up to detect falls and provide remote Doctor Consultation to solve this problem.

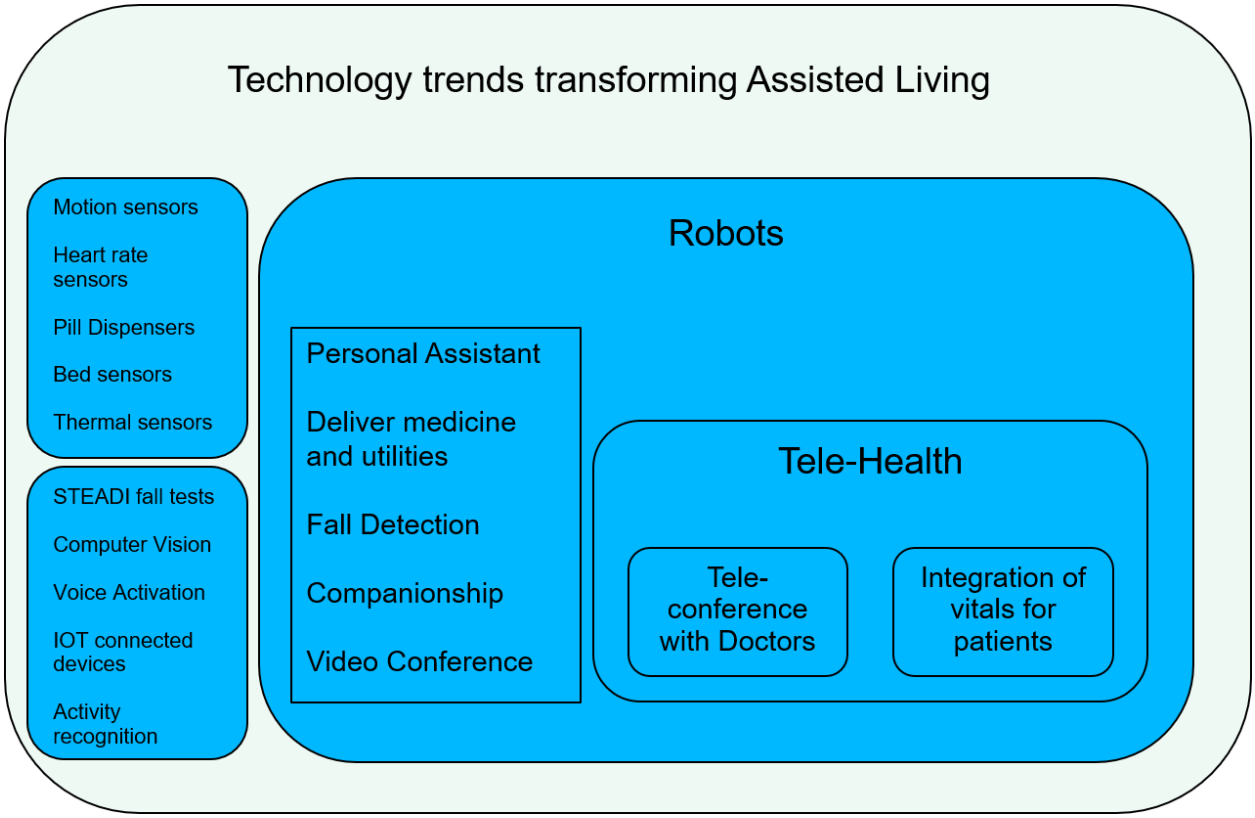
Smart companion Robots can be a personal assistant to the elderly taking care of their physical and mental needs:

- **Companionship**: The Robot can strike intelligent conversations with the elderly. Further entertainment activities like singing, music and personalized videos can be played for the seniors. Games including quizzes and puzzles can also help improve the mood and cognitive abilities.

- **Personal Assistant:** The Robot can send messages to loved ones monitor the daily activities of seniors and send reminders to take medicines at relevant hours.

- **Tele-consultation:** Video Call facility to remotely connect to a doctor for consultation in case of any symptoms.

- **Fall Detection:** Computer vision capabilities can detect falls of the seniors and alert the caregiver instantly.
- **Deliver Medicines and utilities:** The Robot can deliver medicines, water, and other utilities to the seniors.



4.4. Voice Activation and Smart Home technology [10]

Voice activation and smart home technology help the seniors to perform their daily activities from the comfort of their place, moving around only for necessities. Devices ranging from everyday use like lights and fans to electronic devices such as television and fridge can be inter-connected and made to respond to the voice of the seniors.

Voice activation can also prove very useful medically as a lot of advancements have been made in this segment. Daily schedules can be uploaded in the devices which can act as personal assistants reminding the seniors to take medications and perform their priority tasks. As memory loss, mobility, etc. are a common occurrence associated with aging; seniors often tend to forget medications making the daily reminders essential.

Further to this, technologies to monitor the health of the seniors have come to the forefront. Smart technologies like Pill Dispenser can dispense the medicines for the seniors at the scheduled time. The dispensers will store the medicines in separate boxes with reminders to notify once it is ready to be refilled [11].

These technologies will help to keep track of the seniors' health 24*7, raising alerts for any emergencies. This leads to a better quality of life for the seniors as well as keep the caregivers in a better peace of mind.

5. CONCLUSION

The technologies implemented in senior living care have grown tremendously over the last few decades. The ultimate aim of these technologies is to create a safe bubble where the residents are as independent as possible in living their lives. The technologies will act as enablers ensuring the safety of the seniors as they go about completing their day-to-day activities.

Robotics is one of the latest technologies aiming to resolve the problems faced by the seniors by being a go-to support system, entertaining them and providing them remote medical facilities, fall detection alert systems etc. Companies like Invento Robotics have conducted various successful pilot projects in senior living care intending to improve the quality of life of the seniors.

With the senior living cares facing an acute shortage of staff, rising injuries [12], and a rapidly aging population the recent technological developments have been a boon to the centres. A collaboration where the staff works hand in hand with the latest technological innovations may prove to be successful in providing better care and quality of life to the senior citizens.

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